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EXAMINER
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ART UNIT	PAPER NUMBER
2741	3

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

	Application No.	**Applicant(s)**
Office Action Summary	09/134,272	WANG, ZIFEI PETER
	Examiner	**Art Unit**
	Angela A. Armstrong	2741

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1) ☒ Responsive to communication(s) filed on *14 August 1998* .

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☐ Claim(s) *1-18* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-18* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

    a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:

        1. ☐ received.

        2. ☐ received in Application No. (Series Code / Serial Number) _____ .

        3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

14) ☒ Notice of References Cited (PTO-892)

15) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

16) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .

17) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

18) ☐ Notice of Informal Patent Application (PTO-152)

19) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims **1-4 and 7-18** are rejected under 35 U.S.C. 103(a) as being unpatentable over

Graumann (US Patent No. 5,737,407) in view of Polcyn *et al.* (US Patent No. 5,311,588).

.   Graumann discloses a computer system with audio communication capabilities which

implements a voice activity detector for an audio communication system which determines

relationships between peak level of a signal and current level, standard deviation values of the

signal and based on the relationship between peak values and current values of the signal, makes

determinations as to whether the there is speech activity in the audio signal.

Regarding claim 1, it is noted that although Graumann determines peak and signal ratios,

he does not specifically disclose "determining a peak-to-mean likelihood ratio" or "comparing the

peak-to-mean likelihood ratio to selected threshold". Refer to Polcyn who discloses a method and

system for determining the progress of a calling connection be determining signal transitions from

tone to silence, silence to speech, etc. At claim 1, col. 16, lines 49-62 Polcyn *et al.* discloses

"calculating a first ratio level of said audio signals and an average power level of signals..." and

"comparing...ratio levels to a set of criteria..." to determine the line status.

Although Polcyn *et al.* calculates peak-to-mean power ratios, the ratios are a representation of the comparison of the peak of the signal to the average or mean of the audio signal. Applicant has not provided information or indications that the peak-to-average signal ratio provides an improvement in the method for detecting speech in signals over power peak-to-average signal ratios. Hence, the power ratio can be determined and can be expected to perform peak-to-average ratios equally as well as other methods. Therefore, the particular equation used to calculate peak-to-average ratios for an audio signal is merely a design choice.

Therefore, to the extent that Graumann does not calculate peak-to-average ratios, it would have been obvious to one of ordinary skill at the time of invention to modify the voice activity detector of Graumann to calculate peak-to-average ratios for the purpose of determining signal transitions (silence to voice, etc) as taught by Polcyn *et al.*

3.   Regarding claim 2, "determining a short-term averaged energy" is taught by Graumann at col. 7, lines 23-48;

"determining a long-term averaged energy" is taught by Graumann at col. 7, lines 23-48.

4.   Regarding claim 3, "determining whether...short-term averaged energy and a factor is greater than the long-term averaged energy" is taught by Graumann at col. 7, lines 49-67 continuing through to col. 8, lines 1-36;

"determining that current frame represents silence ..." is taught by Graumann at col. 7, lines 49-67 continuing through to col. 8, lines 1-36;

Regarding claim 4, "determining whether a difference between long term averaged energy and short term averaged energy is less than a predetermined threshold" is taught by Graumann at col. 8, lines 37-51;

"determining...current frame...represents voice..." is taught by Graumann at col. 8, lines 37-51;

"determining the peak-to-mean likelihood ratio..." refer to arguments presented in claim 1.

5.   Regarding claim 7, "substrate" is inherent in the computer system disclosed by Graumann at col. 3, lines 40-67;

"processing unit..." is disclosed by Graumann at col. 3, lines 40-67;

"memory..." is disclosed by Graumann at col. 3, lines 40-67;

"memory containing voice activity detector..." refer to arguments as presented in claims 1-4.

6.   Claims 8 and 16 are rejected under similar arguments as applied to claim 3.

Claims 9 and 17 are rejected under similar arguments as applied to claim 4.

Claims 10, 11, and 13 are rejected under similar arguments as applied to claim 1.

Claim 12 is rejected under similar arguments as applied to claim 6.

Claim 14 is rejected under similar arguments as applied to claim 2.

Claim 15 is rejected under similar arguments as applied to claims 3 and 4.

Claim 18 is rejected under similar arguments as applied to claims 1-4.

7.   Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graumann and

Polcyn et al. as applied to claim 2 above, and further in view of Janiszewski et al. (US Patent No.

5,657,422).

Regarding claim 5, "determining an energy...current audio frame..." is taught by

Graumann at col. 7, lines 23-48;

"determining a short-term averaged energy for a prior audio frame..." is taught by

Graumann at col. 7, lines 23-48;

"conducting weighted average...", it is noted that neither Graumann nor Polcyn et

al. disclose weighted averages. Janiszewski discloses a voice activity detection system which

estimates energy and noise of a signal. Specifically at col. 6, lines 1-8 Janiszewski discloses

using a smoothing constant in calculating signal estimates and setting the smoothing constant to

provide for acceptable frame averaging.

Therefore, to the extent that neither Graumann nor Polcyn et al. disclose weighted

averaging, it would have been obvious to one of ordinary skill at the time of invention to modify

the voice detection of system of Graumann to calculate peak-to-average ratios for the purpose of

detecting signal transitions and changes as taught by Polcyn and further, to conduct a weighted

average by using a smoothing constant for the purpose of providing acceptable frame averaging

as taught by Janiszewski et al.

8.   Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Graumann and

Polcyn et al. as applied to claim 1 above, and further in view of Nishiguichi et al. (US Patent No.

5,664,052).

Regarding claim 6, "calculating averaged peak-to-mean ratio...determining a first

result...determining a second result...conducting a ratio between first result and second

result..." it is noted that although the combination of Graumann and Polcyn et al. teach or

suggest voice activity detection using peak to mean ratios for detecting signal transitions and

changes, the combination does not teach or suggest normalizing the ratio. However, refer to

Nishiguichi et al. who disclose a method and device for discriminating voiced and unvoiced

sounds. Specifically at col. 7, lines 31-67 continuing through to col. 8, lines 1-32 Nishiguichi et

al. discloses a normalized peak ratio that is compared to a threshold value to determine if a signal

is a voiced sound or unvoiced sound..

Although Nishiguichi *et al.* calculates normalized peak-to-standard deviation ratios, the

ratios are a normalized representation of the bias (localized presence) of the peak values on a

time scale within a given segment of the audio signal. Applicant has not provided information or

indications that his method of determining a measure of normalized peak signal ratio is an

improvement in the method for detecting voiced/unvoiced/silence in a signal over other

normalized peak biasing schemes. Hence, the normalized peak-to-standard deviation can be

determined and can be expected to perform a normalized peak signal to frame variation

determination equally as well as other methods. Therefore, the particular equation used to

calculate normalized peak signal to frame variation for an audio signal is merely a design choice.

Therefore, to the extent that neither Graumann nor Polcyn et al. teach a specific

normalized representation of peak to variation measures of an audio signal, it would have been

obvious to one of ordinary skill at the time of invention to modify the voice activity detector of

Graumann to calculate peak-to-average ratios for the purpose of detecting signal transitions and

changes as taught by Polcyn and further, to detect peak to signal variation for the purpose of

determining if a portion of the signal is a voiced or unvoiced sound as taught by Nishiguichi et

al.

Conclusion

9.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Kawamura et al. (US Patent No. 5,442,712) disclose a sound amplifying apparatus which

suppresses howl in a signal by using a howl detector that determines a peak-to-mean power ratio

and compares it to a predetermined threshold.

Benyassine et al. (US Patent No. 5,774,849) disclose a method for generating frame

voicing decisions which includes calculating a running average for a frame energy and

background noise characteristics, updating the running average using a weighted average.

Xie (US Patent No. 5,838,269) disclose a voice activity detector which generates a

silence decision for a signal from detecting the ratio of a short term averaged energy and a long

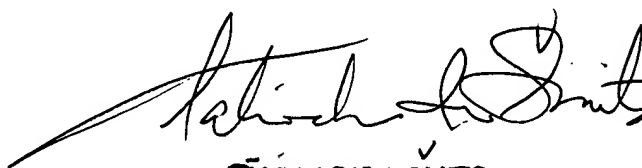term averaged energy and comparing the ratio to a silence energy threshold.

Gupta et al. (US Patent No. 5,649.055) disclose a voice activity detector which calculates

averaged energy, changes in the average signal level over a frame, and compares energy levels to

predetermined thresholds for determining voicing activity.

10.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Angela A. Armstrong whose telephone number is 703-308-6258.

The examiner can normally be reached on Monday-Thursday 6:30-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, David R. Hudspeth can be reached on 703-308-4825. The fax phone numbers for the

organization where this application or proceeding is assigned are 703-308-6306 for regular

communications and 703-308-6296 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the receptionist whose telephone number is 703-305-3900.

AAA
March 20, 2000

TALIVALDIS I. SMITS
PATENT EXAMINER